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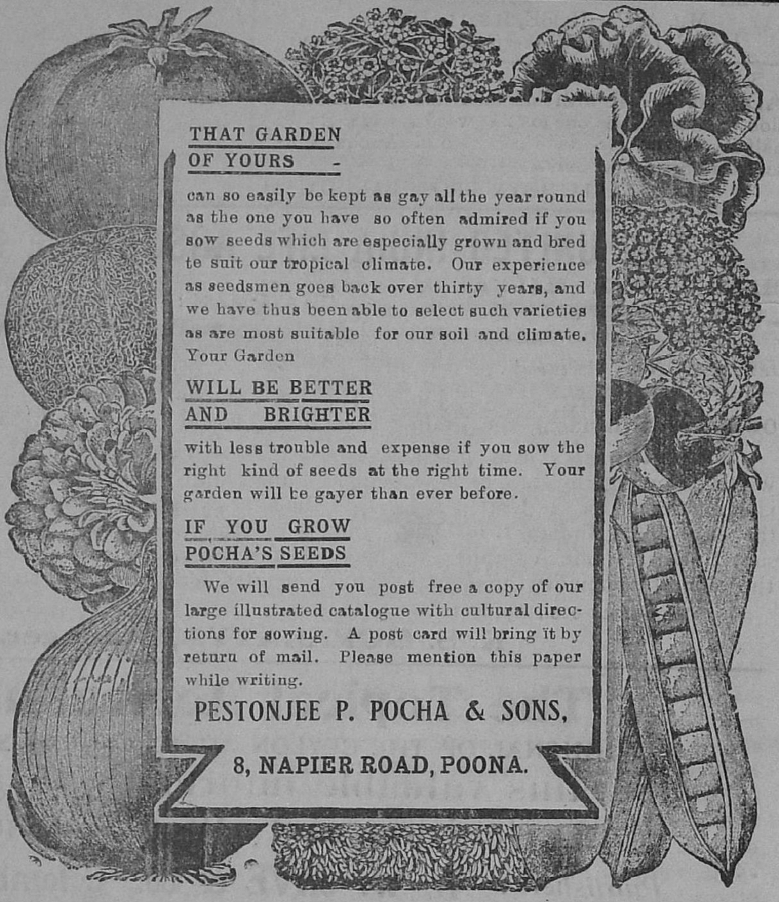

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THE INDUSTRIAL DEVELOPMENT OF INDIA.

By H. N. Morris.

The question of the industrial development of India is one of absorbing interest, not only to the people of India but to all classes of manufacturers and merchants in this country (Great Britain) who have looked upon India in the past as one of the most important markets for their goods. When we remember that India has an area larger than that of Europe, and a population of over 300 millions, and that in 30 years the population has increased by 50 millions, or more than the population of Great Britain, the problem becomes even bewildering in its greatness. The standard of living, which is very different from that of Western Europe, has risen under British control and with the development of the railway and irrigation policy of the Government this standard has continually been rising, and with it the demand for manufactured goods has increased.

India has always been looked upon as an agricultural country, and it is only in the last few years that industries other than home or cottage industries have begun to be developed and the vast resources of minerals and of power been turned to serious and practical account. The industrial development of Great Britain in the beginning was to a large extent due to the cheap and plentiful supply of coal as a source of power, and the fact that only comparatively small supplies of coal have been available in India accounts, in some degree, for the slow development of industries there in the past.

The position is now changed. Other sources of power than coal have been discovered. Geologists have drawn attention to the vast natural resources in India, and we seem to be now on the threshold of a new era of development with enormous possibilities not only for the people of India but for the whole world.

Indian Industrial Commission, 1916—18.

Various attempts were made by the Government of India and the India Office to encourage the development of industries, but without adequate result, and the War found the country in a precarious position owing to its dependence on imports for the safety of the country and for so many necessities of life.

In 1916 it was decided to take energetic action. Sir Wm. Clark stated in the Legislative Council that the time had come when the question of the expansion and development of Indian manufactures and industries should be taken up in a more comprehensive manner than had hitherto been attempted; that a Commission was therefore to be appointed to make a full examination of the position so that when after the close of the War the financial position was once more established on a normal basis the Government might be able, without further delays, to take such action as might seem suitable after considering the Commission's recommendations. The Commission, which was appointed under the presidency of Sir Thomas H. Holland, K.C.I.E., was instructed to examine and report upon the possibilities of further industrial development. Their Report has now been published by the India Office and should be studied by everyone interested in the Indian trade. It deals so largely with matters connected with Metallurgical and Chemical Industries, and if its recommendations are carried out, is likely to have such far-reaching effects that I venture to depart somewhat from the usual practice of these meetings and bring before you some of the impressions that have been made upon one who has a knowledge of the Chemical Industry here, and is at the same time acquainted with some of the recent developments that have taken place and are in prospect in India.

Developed and Undeveloped Minerals and Power.

The Government of India has been favoured with an excellent and well-organised Geologicl Department which has brought to light the immense mineral resources of the country, in Iron, Manganese, Aluminium, Tin, Lead, Copper, Tungsten, Antimony, Thorium, Mica, in addition to Gold and Precious Stones. Many of these are quite undeveloped and the reasons for this will be given in due course. Aluminium, although existing in vast quantities in the form of high-grade Bauxite, has been practically untouched; Copper is in much the same position; other minerals have been sent out of the country to be used in other industries which have not yet been established in India such as, for example, Manganese, Tungsten and Mica.

I have already pointed out that the scarcity and poor quality of most of the known or accessible coal deposits has had something to do with the retarded development of industries. It must be noted, however that changes are now taking place. The production of coal in India in 1917 had risen to over 18 million tons and deposits have been found of suitable quality for the manufacture of iron and steel on a large scale, but this also will be referred to later.

The Commission refers to the possible assistance from oil as fuel, but points out that the oil wells in Burma cannot be counted upon to give such an increased production as would make up for the deficiency in Indian coal. In this connection reference should be made to the assistance that is now and will be in the future given by supplies of oil from Persia. The Anglo-Persian Oil Company has already come to the assistance of India.

The chief Indian coalfields are situated in Bengal and Behar, and the freight to the industrial centres on the West increases the cost to the consumer from about 4/8d. a ton, the pit mouth value, to four or five times that amount.

British interests in the Persian Gulf are likely to be intimately associated with India, and I think it will be found in the future that India owes to our Government a special debt of gratitude for their foresight in obtaining control of what promises to be one of the most valuable oil fields in the world. The Persian oil has been used with success in Bombay for the last three years for steam-raising, and tests were made in 1916 on several locomotives on the North-Western Railway which were so satisfactory that the Company decided to proceed with the conversion of all the 250 engines in the Karachi district from coal to oil burning. The oil gives approximately twice the efficiency of coal.

Another important development which will be far-reaching in its effects is the production of hydro-electric power which has already been proved a success on a large scale. Several water power undertakings are now in operation in India, the most successful being that of the Tata Hyro-Electric Power Supply Company. This company has taken advantage of the heavy rainfalls during three or four months of the year in the Western Ghats where the minimum fall is 80 inches and the maximum as high as 500 inches. By the construction of dams immense quantities of water are stored at a level of 2,000 ft. above the plains where the generating station is placed. The lakes formed by the dams have a storage capacity of 9,881 million cubic feet. and the fall to the power house is 1,734 feet. The current is conveyed by cable from the generating station, a distance of 43 miles, to the distributing centre in Bombay. According to the last report of the company 41 mills in Bombay and district were being supplied with power, and the present B.H.P. of motors in service was 45,000 in addition to 5,500 H.P. supplied to other consumers. The mills are supplied with current at half an anna per unit, or ·55 anna including the provision of the electrical installation and day and night loads at a lower rate. The company last year paid a dividend of 8% on the ordinary shares, so that it is evident this power enterprise has proved a success. Extensions are being made, and it is proposed to increase the production as soon as possible.

Lord Sydenham, in the "Times Supplement" of February 1918, described another great water power scheme which has been proposed, also on the Western Ghats, about 43 miles from the coast. This, the Koyna River Scheme, is estimated to give as much as 300,000 H.P. for 8,000 hours in the year, and, as Lord Sydenham says, the prospects which our magnificent scheme holds out are immense."

Present Position and Prospects of Chemical Industries.

Salt and Heavy Chemicals:

Salt is the necessary raw material for some of the most important heavy chemicals, and it is produced in India in large quantities. The yearly consumption of salt is from $1\frac{3}{4}$ to 2 million tons, and of this more than $1\frac{1}{4}$ million tons are produced in the country, partly from rock salt in the Punjab, partly from the solar evaporation of salt lakes in Rajputana, but more than two-thirds by the solar evaporation of sea-water. The only part of India which imports salt in any quantity is Bengal. This is unfortunate as some of the chemical development would naturally take place in Bengal where other conditions are favourable. There seems, however, to be no satisfactory reason for the absence of salt manufacture in or near Bengal. By concentration of the manufacture into one or two large areas not only are the conditions as to climate suitable, but it would be possible to recover some of the by-products, such as magnesium and potassium chlorides and bromine. In the South of France, where the weather conditions are not so favourable, salt is produced by solar evaporation, by-products are recovered and an alkali industry of considerable magnitude is in existence, and the same could be carried out at some place on the coast within reasonable distance from Calcutta and the Bengal coalfields.

At present there are no alkali works of importance in India, but salt is produced in large enough quantities and cheaply enough to establish the industry in course of time. At the same time there is no doubt that the concentration of the production of salt by solar evaporation into fewer and larger areas would reduce the cost to the Government of the collection of duty, reduce the cost of production of the salt, and encourage the starting of chemical industries dependent on salt as a basic raw material. There are, it is true, several plants at work for the manufacture of caustic soda, one at the Eastern Chemical Company's works near Bombay, and another at the Magadi Soda Company's works, near Calcutta, but these are only for the conversion of imported soda ash into caustic and concentration of the lye. The manufacture of neither carbonate nor caustic from salt has yet been attempted.

Sulphuric acid is another heavy chemical of great importance to an industrial country, and its manufacture has been proved to be practicable and is being carried out satisfactorily by the Eastern Chemical Company in the West, by Parry and Company near Madras, by Waldie and Company in Calcutta and Cawnpore, and by the Burma Chemical Industries in Rangoon. The two largest iron manufacturers also have sulphuric acid plants to deal

with their by-product ammonia; but India is as yet in a weak position with regard to this product, inasmuch as no cheap source of sulphur has been available and manufacturers have to import sulphur from Italy aud Japan. A certain amount of zinc concentrates will soon be availble from the Burma mines, and arrangements have been made to utilise these. Investigations are continually being made, and it is known that deposits of sulphur exist within cheap sea transit of the West Coast, in addition to which deposits of copper sulphide ore have been found in several places in India, which give some hope of a cheap supply of sulphur from that source also.

Hydrochloric and nitric acids are being made in quantities to meet the immediate demands of country by the Eastern Chemical Company and others who have sulphuric acid available.

Iron, Steel and By-Products.

By far the most important development of recent years is that of the iron and steel manufacture, which is now established on a large scale in Bengal. The Bengal Steel and Iron Company were the pioneers of this industry, aud actually commenced operations as long ago as 18·5. After passsing through a chequered career they have eventually established their business on a solid basis and are now producing pig iron at the rate of 120,000 tons a year and have extensions in course of construction. Their works at Kulti are about 140 miles from Calcutta, and the company claim to have a practically inexhaustible supply of high-class ore containing 60 to 66 per cent. of metallic iron. They possess also collieries within about a mile from their works and in the Jherria coalfields forty miles away. Limestone is also plentiful in the surrounding districts. They have two batteries of 34 Simon-Carves coke-ovens producing 80,000 to 100,000 tons a year, and a third battery of 34 is nearly completed and the foundation for a fourth started, so that the production will be doubled when these extensions are completed. They recover the ammonia as sulphate, in connection with which they have a sulphuric acid plant. The tar produced is at the rate of 2,500 tons a year, and the benzol if recovered would be about 200,000 gallons. These are, of course, small figures to us and could not be profitably refined at the producing works, nor do I think they can be economically dealt with in India unless at a central refining factory where the product from several works was collected.

The Tata Iron and Steel Company is of a much later date, being formed only in 1907 but its growth and success have been phenominal. The works are at Jamshedpur, 149 miles west of Calcutta and 37 miles from the nearest ore mines and 118 miles from the nearest coalfield. The first machinery was installed in 1910, and the coke-oven and blast furnace started in 1911. This company, like the one previously mentioned, own deposits of ore containing over 60% of metallic iron. They have coalfields, limestone deposits and magnesite deposits, and have made arrangements for reduced railway rates on all their traffic for ten years. The original programme of the company was a production of 120,000 tons of pig iron per annum, but this has already been exceeded, and when the Industrial Commission issiued their Report the production of iron was more than double that amount, and the steel capacity was nearly 17,000 tons a month. The rolling mills were producing about 120,000 tons of rails and smaller sections yearly, The number of men then employed by the company was 13,000, and 10,000 were working for contractors engaged on extensions. When these extensions are completed it is anticipated that a minimun of 1,136,000 tons of ore will be consumed yearly and 1¼ millions tons of coal, the bulk of which will be coked in 150 13-ton Wilputts coke-ovens, having a coking time of 18 hours. These are the latest Steel Corporation type, to Mr. Wilputt's design, and the same gentleman is designing and acting as consulting engineer in regard to the by-product recovery plant. There will be consumed also 380,000 tons of dolomite and 71,000 tons of limestone. Steel will be produced by seven stationary open-hearth furnaces of from 50 to 60 tons each, and also three duplexing furnaces for which the steel will be refined in Bessemer converters and then transferred to the duplex plant. A new rail blooming mill is to be installed, a new plate mill, a continuous sheet bar and billet mill of the latest Morgan Construction Company's design with a capacity of about 80 tons per hour. In addition new sheet mills, and shape mills are to be installed dealing with the 600,000 tons of ingots which the open-hearth and duplexing furnaces will produce. The yearly production of by-products is expected to be 2,300,000 gallons of crude naphtha, 10,000 tons of sulphate of ammonia and 40,000 tons of tar. The large amount of benzol, toluol, naphtha and creosote available from the recovery plants at these works opens up possibilittes for developments in chemical manufacturing, and the Companies are quite alive to the fact. Arangements are being made for the establishment of a cycle of industries around the Tata's works at Jamshedpur, including spelter manufacture, galvanised iron, sulphuric acid from concentrates, benzol purification, and general coal tar product manufacture, and the utilisation of the slags.

There is no modern development more important to the country and so necessary for the future as this steel and iron industry of India. With the cheap coal, cheap and high grade ore, cheap labour, and exceptional freights to and from seaboard, the industry is in a more favourable position than that of any competing country for the export of their surplus production to Japan. China, and even to North and South America if not debarred by high tariffs. I see no weakness in their position, and if only salt is manufactured in Bengal on a scientific basis, as suggested above, to allow of the economical manufacture of heavy chemicals, Jamshedpur may easily become one of the most important industrial centres of the world.

Agriculture and Fertilizers.

The industry of the greatest magnitude in India must always remain as it is now, that of Agriculture. But this will be transformed. With the establishment of iron and steel manufacture will come the manufacture of agricultural machinery, and in the development of the basic chemical industries fertilizers will undoubtedly play an important part. The people will require educating, and in this the Agricultural Colleges and the Government will have to help. When a cultivator is shown that by spending a hundred rupees in fertilizers he can increase the value of his crop by 300 or 400 rupees, he will soon be convinced. The question is, how far can India supply herself with the required chemicals. Potash in the form of nitrate is an old Indian industry, and in the last ten years the yearly production has varied from just under 15,000 tons to 25,000 tons. This may be increased possibly by concentration of the salt manufacture and the recovery of potash from the mother liquors and also from the blast furnace gases, but nothing has yet been done in these directions.

Phosphates present a difficulty. Some of the crops in India notably indigo, require superphosphates, and so far no cheap source of manufacture has been found. No good quality of phosphate of lime has been found in India, which would be suitable for the manufacture of superphosphate. Most of the phosphate discovered has been in the form of nodules containing a high percentage of carbonate, and thus quite unsuitable for treatment with sulphuric acid. Some deposits of mixed phosphates of lime and aluminium are said to have been discovered in Bengal but so far as I have been able to ascertain these have not been suitable for treatment with acid. There are, however, excellent deposits on the Red Sea Coast that can be shipped at a low cost to the West Coast ports, which would place India in as favourable a position as most countries and better than either Japan or European countries which have to import their phosphate rock. The difficulty with regard to sulphuric acid has already been referred to, and this can only be remedied by cheap sulphur or sulphur ore.

Ammonia is available in the form of sulphate of ammonia from the coke-ovens and will be available in increasing quantities from this source, but it will be only a fraction of what India will require when the advantages of fertilizers are understood. Nitrates, with the exception of the comparatively small quantities of nitrate of potash obtained from earth deposits, will have to be imported until it is possible to produce economically by the fixation of atmospheric nitrogen.

Electro-Chemical Industries.

Electro-chemical industries depend for their success on cheap power. Until the Tata Hydro-electric Power Company had proved that power could be produced economically from the Western Ghats, the establishment of industries requiring cheap electricity for their success could not be considered. Now the conditions are changed. The production of hydro-electric power at such a low cost as has been proved possible, makes practicable a number of electro-chemical industries. The manufacture of aluminium from bauxite, which is plentiful and of good quality; the decomposition of salt and production of soda compounds; and lastly, but of greater possibilities than all the others, the fixation of atmospheric nitrogen, and production of ammonia and nitrates. All these are now practicable propositions for India. So far as I am able to judge neither Switzerland, Norway or even Niagara, can compare with such schemes as the Koyna River and other water power projects in India.

Indigo.

Indigo the most important dye of commerce, and the value of the indigo used is not much less than that of all the coal tar dyes put together. Twenty years ago India in addition to supplying its home requirements, exported natural indigo to the value of 3½ millions sterling per annum, but prior to the War this had gone down to £142,000 owing to the competition of the German standardized synthetic product; in 1916 it had risen to £1,385,000, and in 1917 was practically the same, and there are no statistics to show the local demand, which is stated to have considerably increased. It is now a question as to whether the competition of the synthetic product will drive the natural indigo from the market. In 1917 I visited one of the best conducted of the indigo works in Behar and discussed the position and prospects of natural indigo with Mr. W. A. Davis, the indigo research chemist, and Dr. Hutchinson at the Pusa Agricultural College. Interesting and valuable researches have been carried out by these gentlemen. It has been definitely established that by the use of superphosphate as a fertilizer the yield of indigo per acre can be increased both in quantity and quality. Unfortunately superphosphate is not yet made on a large scale in India, and there have been difficulties in obtaining supplies during the War. It is essential that the fertilizer should be manufactured in India and supplies assured for such industries as that of indigo if they are to have any chance of success.

Great improvements have been shown to be possible by means of scientific control of the fermenting process, enabling the manufacturer to obtain increased yields of colour from the plant. It is also considered necessary that natural indigo should be standardized and sold in a paste form and that this standardization should be done in India for use both in the country itself and in those other markets where a standardized paste is preferred.

It has been impossible to carry out all these proposed improvements during the War, but if they are carried out and if the planters work together. I think with Mr. Davis, that the natural indigo will be able to put up an interesting fight with the synthetic dye.

Mr. D. J. Reid, whose works I visited at Belsund, has stated that with a yield of 35 seers to the acre which with proper selection of plant and fertilization should be obtained, natural indigo, of 60% strength, could be produced at 40 rupees per maund. Taking the rupes at 1/4d., that means that 60% indigo will cost 9d. per lb., which is equivalent to 3d. per lb. for the 20% paste. The German pre-war price was 8d. per £., and the present price 2/9d., so that if Mr. Reid's estimate be correct we may expect natural indigo to be able to successfully meet the competition if the synthetc product is sold at one-half the pre-war price.

It is only right to add that another planter, Mr. G.R. Macdonald, doubted whether, taking bad years into account, Mr. Reid's estimate would be realised, and thought the figure should

be taken as 80 rupees a maund. This represents 6d. per lb. of 20% indigo, and even this would meet competition with synthetic indigo at pre-war prices.

Mr. Bernard Coventry, late agricultural advisor to the Government of India, has expressed the opinion that if only they could grow the plant properly, which I take to mean pay proper attention to selection and fertilizing, they could get such a yield that he could undertake to undersell synthetic indigo at practically any price.. Which of these estiamtes will be proved to be correct in the future, whether the 20% paste will cost 6d. or 3d. or less, depends very much on the planters themselves, who will have to co-operate in their business organisation and methods of marketing and at the same time adopt improvements in agriculture, in manufactare and in botanical selection. If the planters had placed the indigo industry 25 years ago under efficient scientific control it is not likely there would have been any synthetc indigo industry to-day.

Tannic and Gallic Aeids.

Valuable vegetable tanning materials are found in India, and large quantities are exported. In 1914 the value of the myrabolams alone exported was £379,626, and in 1916 £470.157. As these vegetable materials are only nsed for their tannic or gallic acid contents, which vary from about 20% to 40o/o, it is reasonable to look forward to the extraction of the acid contents taking place in India, thus effecting a saving in cost of transport. The Commission reports that the preparation of tanning extracts has been tried from time to time, and generally without much success, but the conditions under which such attempts have been made were not satisfactory and should not preclude further work in this direction.

Wood Distillation and Alcohol.

Various proposals have been made for the establishment of wood distillation works in India, but nothing of value seems to have been done. There is a certain amount of risk in any such undertaking, as the products viz.: wood naphtha, tar, and acetate of lime, would have to be placed on the market, and the demand for them in India has not been of any importance in the past. A market would have to be created. The charcoal produced would have to pay heavy carriage charges if the local market did not consume all that was manufactured.

A distillation plant in connection with a large saw mill where the waste timber and sawdust were distilled would certainly have a chance of success if favourably situated for the distribution of the charcoal.

In 1816, 286 million cubic feet of timber were produced in India, but this is only a fraction of what may be expected from the 249,000 square miles which the Forest Department controls.

Waste vegetable products such as the paddy husk also could be carbonised where produced and give the same products if the local demand for them or the prices obtainable for export justified the necessery capital outlay.

The conversion of the 50% to 60% of cellulose contained in timber into dextrose and alcohol economically is said to be now accomplished. This opens up new possibilities of development in the manufacture of a cheap methylated sprits for domestic use, but I do not think that it is likely to become a serious competitor of kerosene and petrol, as some people suggest.

Cement, Artificial Stone and Glass.

Cement manufacture is already well established in India. At least four works are in operation and the cement is officially reported to be satisfactory.

Magnesite is mined and calcined in Salem district in Madras State, and was formerly sent to Germany to be made into a kind of Sore cement or artificial stone by the addition of magnesium chloride and diluents, in some cases being sent back to India again in the form of the mixture ready for use. This is work that should properly be done in India.

Many attempts at glass manufacture have been made, but without much success. I went through one of the least unsuccessful glass works in 1917. The works were situated a long way from any town, the main idea having been to be convenient for a supply of timber as fuel. It is true the first cost of the timber was small, but the cost of carriage, handling and cutting up increased it, and even working with a German gas plant I estimated the cost to be higher than in a large industrial centre, where there would have been many other advantages. Several German machines had been erected for making bangles and other things, but could not be worked profitably.

There is no difficulty in obtaining suitable raw materials and actually making glass in India. The difficulty is to make and market the finished glass articles in competition with Japan and other countries. Unlike the steel and iron manufacture, that of glass consists in four or five different trades, and it is no use attempting to do all on a small scale. By concentrating on one specialised branch of the trade and putting in the best machinery I think success could quickly be attained.

Vegetable Oils and Soaps.

There are only a few power driven crushing mills used in India, most of the vegetable oils used being pressed out by hand or bullock driven presses. The amount of seed cake exported in 1916, was 150,000 tons, valued at three-quarters of a million starling, and the amount of seed exported was 655,000 tons valued at £6,748,000 and 1½ million tons in 1912, valued at £17,719,000. This gives some idea of the magnitude of the business. A new company has recently been formed by Messrs. Tata, with a large capital, for the production of vegetable oils by means of power presses, and is an important and interesting development. The plentiful and cheap supply of vegetable oils naturally suggest the profitable manufacture of margarine.

Soap has not yet been manufactured seriously anywhere in India, and it is not likely to be made on any large scale until caustic soda or soda ash is produced and sold at reasonable prices locally.

Pharmaceutical Products.

There is much room for improvement in the manufacture of drugs and extracts from plants. The synthetic drugs made from coal tar products can only be made satisfactorily after the development of some of the by-product plants connected with the iron and steel works in Bengal giving plentiful supplies of benzol, toluol, etc.

Non-Ferrous and Rare Metals.

The zinc production in Burma has already been mentioned. In this connection there will be available a certain quanity of zinc concentrates which will be used for sulphuric acid-manufacture.

Lead is also produced in considerable quantity, and Tungsten, which has found a ready sale for the manufactnre of "high speed" steel.

Copper is a disappointment, and refined copper is not actually being produced anywhere in India. I have had samples of copper sulphide ore submitted, but these have been of low grade and in inaccessible places. There is no doubt that the discovery of some good copper ore would be of great benefit, and help a cycle of other chemical manufactures.

Aluminium is plentiful in the good supplies of bauxite which are available. The Monazite deposits at Travancore are important, and the time will come when it will not be found necessary to send the mineral out of India to have the thorium extracted and thorium nitrate made. The value of the Monazite exported in 1914 was £41,400, and in 1916 £37,714.

The gold produced has varied very little in amount during the last five years being steadily about 2⅓ millions sterling value.

Paper.

The present consumption of paper in India may be taken at about 80,000 tons per year, and with the spread of education and with increasing commercial prosperity, it is certain to increase. About a third of the amount consumed is manufactured in India. Practically no progress has been made in the last five years. There are at present only four paper concerns actually working. Various kinds of raw materials have been tried, but the only two that give at all promising results are savannah grass and bamboos. The savannnah grass is found in Assam and gives a good paper. The bamboo has not been a success as the nodes or knots have been found to prevent penetration of the liquor used for digesting and prevent efficient bleaching.

Mr. Raitt, consulting cellulose expert to the Government of India, Forest Department, claims that the Forest Research Institute has succeded in evolving a system of digestion which entirely eliminates this trouble and gives a pulp equal to the best wood pulps in both quality and colour. Whether this will prove satisfactory on a large scale remains to be seen. but if the pulp were passed through a sieve any nodes that were unacted on or insufficiently digested would be kept out of the machines. Perhaps this is what the Research Institute has done.

Mr. Raitt states as a very modest estimate that Burma, Bengal and South west India could produce from bamboo fifteen million tons of pulp per annum, and Assam five million tons from savannah grass. India could therefore, he says, produce pulp for the whole world. But experience has shown that bamboo and grass pulps cannot produce all grades of paper. They only produce a portion of those in demand in India.

Bleaching and Dyeing.

Many of the large textile mills have dyehouses where bleaching, dyeing and finishing operations are carried on. Manufacturers have been handicapped in the past by difficulties in obtaining the necessary chemicals, so that this branch of the textile trade will benefit by the expansion of the chemical industry.

Technical Education.

From what has been said it is evident that if only a fraction of these extensions or developments of chemical industries are carried out, and for the most part they are sound in practice, there will be a marked increase in the demand for trained chemists, engineers and foremen. The question of education, and especially the provision of technical education of an advanced kind has naturally had the serious consideration of the Industrial Commission. In the past the system of higher education in India, as pointed out by the Commission, has encouraged literary and philosophic studies to the neglect of those of a more practical nature; the Universities have turned out teachers, lawyers, clerks and Government servants.

It was not until the beginning of this century that after an Education Conference at Simla called by Lord Curzon, drastic reforms were carried out in higher edmcation generally, and in technical and industrial education in particular. Scholarships were established to enable Indian students to proceed to Europe and America for special training. This system has only been partially successful, because whilst no difficulty was experienced in gaining access to all and every educational institution, access to work-shops was not so easy to obtain.

Several sound recommendations are made by the Commission. It is suggested that travelling scholarships should not be given to ordinary students but to men who had been actually employed in factories or workshops and who had acquired some practical knowledge.

Other recommendations are made to improve the apprentice system in such industries as mechanical engineering, giving practical training in the workshops and theoretical instruction in attached training institutions. Industrial schools are recommended for those who are, or wish to be, engaged in cottage industries, the the headmasters being men with practial knowliedge of the industries taught. Universal primary education and an increase in the number of technical colleges complete the important suggestions of the Commission on education.

In addition to education, housing and welfare work are dealt with as being of the utmost importance in the industrial development of the country. (Contd. on page 41.)

"COMMERCE & INDUSTRIES"

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INDIAN CHEMICAL INDUSTRIES.

"The Industrial Development of India" with special reference to the Chemical Industry is the title of an address given before the Society of Chemical Industry at Manchester by Mr. H. N. Morris, Chairman of the Eastern Chemical Company Limited, Bombay, which appears elsewhere in this issue.

India is a vast continent having an area larger than that of Europe and a population of 350 millions. Under British administration, the standard of living has been continually raised and the demand for the manufactured goods of foreign countries considerably increased. Owing to the policy adopted by the Government, India has always been regarded as an agricultural country and the home or cottage industries have been left to take care of themselves. Yet, the cottage industries of the land have survived the severe test and strain of centuries in spite of the apathy on the part of the Government and the educated classes who have favoured the foreign goods imported into India. This fact speaks volumes as to the pre-eminence of the Indian industries in the past.

The war has opened the eyes of the foreigners to a better recognition of the fact that India is a land of enormous natural resources and vast possibilities. The development of the indigenous industries of India involving the utilisation of the enormous supply of raw material and creating profitable employment to the millions of her people is one of most vital problems engaging the immediate attention of the people throughout the land. It will considerably add to the economic strength and stability of India. Till now, Tanning materials and Hides and Skins in their raw or unmanufactured state are being shipped to foreign countries in enormous quantities only to be transformed into finished products and partly re-shipped to India in some shape or other. To-day, the Tanning and Leather Industries offer very great and lucrative openings to the people of the land; for, India will, in future, refuse to export her raw materials unless they are made into finished products.

To quote another instance, during the past several years, foreign countries robbed India of immense quantities of her oil-bearing seeds which were crushed beyond the seas while the oil and the cakes were very largely used in the countries where they were crushed. This country was deprived of the useful and necessary constituents of the soil. The people have begun to recognise that the export ot oil-seeds has considerably impoverished the land and should therefore be stopped. The demand for the cakes as food for cattle and as manure for the soil is greatly increasing. It may be that the methods employed in the production of the oil and the oil-cake are, to a great extent, uneconomical but they are bound to improve in course of time. This change in the condition of things is being rapidly watched by the foreigners with keen interest. They have been able to take full advantage of the opportunities offered by these changed conditions and have been quickly modifying their businesses so as to make in India many of the things which they have been sending from their own countries.

On the other hand, Indians in their own land of birth have been suffering from serious disadvantages; and have been consequently unable to avail themselves of the opportunities that are opening before them. They have been denied the education and the training of the kind that is accorded to their brothers in the foreign countries. Times without number, they have complained of the want of facilities and training that are essential to make them successful captains of industry and trade. It has been repeatedly stated in the press and on the platform that the system of education imparted to young Indians is obsolete and uusuitable in the present conditions of the country. Because the system of education is controlled by the Government, without any regard to the people's requirements, it has become neither popular nor profitable. It is regarded as nothing but a costly luxury. In spite of the resolutions repeatedly passed by successive sessions of the Indian Industrial Conferences for the spread of technical and industrial education and training and the establishment of technological Institutes in India, no adequate steps have yet been taken by the Government to meet the growing demands of the people. The Government have yet to settle their policy on the question of technical education. It was often urged that Indians should be appointed Trade Commissioners in foreign countries and represent the real interests of Iudian Trade and Industry. The want of the Institutes of Technology and Scientific Research has been felt very keenly throughout the country. Thus, the intense poverty of the people of the land and the defective education which is often considered as too literary and out-of-date are the two real stumbling blocks to the industrial development of India.

It has been repeatedly stated that the Indian Agriculturist is too conservative in the matter of improving the fertility of the soil and of increasing the production of economic crops such as indigo. He is generally indebted and bears the burden of heavy taxation which does not benefit him. He therefore tries to remain content with any margin of income, and does not choose to use fertilisers to improve the soil and to make agriculture more scientific.

India is dependent on foreign countries for the supply of chemists and practical engineers and other technical men in the absence of suitable institutions in this country to train efficient men. She is also obliged to pay heavily for the foreign chemicals and engineering stores which are absolutely essential to meet the everyday requirements in this country. Indian chemical and engineering industries have been obviously left in the back-ground. It was only the other day that an Engineers' Association was formed. No attempt has yet been made so far to organise an Indian Chemical Society. While recognisiag the fact that India is provided with enormous natural resources, her people are unable to take advantage of the opportunities thrown open to them as a result of the war in the vast field of the manufacturing industries. The sooner they realise the fact and organise themselves the bettter.

As regards indigo, it is quite possible to increase the yield of natural indigo in this country at least sufficient to meet the local requirements without depending upon the importation of the artificial stuff. Provided steps are taken to increase the crop, it is even possible to compete with the synthetic indigo produced largely in Germany, Great Britain and the United States. With the use of fertilisers, like oil-cake, sulphate of ammonia and superphosphates manufactured from bones by means of sulphuric acid there will be considerable increase in crops like indigo which are essential for the development of chemical industries. With the development of the Alkali industry on modern lines by the electrical processes other chemical industries such as bleaching, soap-making and paper-making would also rapidly develop on a large scale as they involve the utilisation of the Caustic Soda and the Chlorine obtained by decomposing common salt. If it be the real intention of the Government to help the development of Indian industries for the benefit of India and of the Indian people, there should be no delay in solving the most important problems like the technical education and the immediate establishment of Technological Institutions throughout the country to train Indians in technical professions.

At the same time, an equally important duty rests on the shoulders of the people; in the matter of the development of Indian Industries, particularly the chemical industries, there are Indian chemists scattered throughout the country. They should lose no time in organising an Indian Society of Chemical Industry even on the smallest scale possible which will directly and indirectly help the formation of Research Institutes owned and controlled by private enterprises throughout the land.

TRADE SLUMP.

A leading English firm of London in their letter dated 3rd instant says: "We think we are in for a long period of slow, indifferent trade, and it will probably take some years for the exchanges to right themselves. Every nation is poorer off than before the war, and each one has discovered that the apparent wealth it had piled up during the war was only a paper one which is fast disappearing".

TRADE ENQUIRIES.

The following trade enquiries have been received by the Director-General of Commercial Intelligence, 1, Council House Street, Calcutta, who will welcome replies to be addressed to him direct by any individual or firm interested, mentioning invariably "Commerce and Industries."

Firms replying to these enquiries should furnish their bank references with their replies.

Agency Business.

(J—123)—A firm in Durban (Natal) would like to hear from manufactures desiring representation in South Africa.

Agency Business.

(J—124)—A firm in Paris with a branch in Belgrade wishes to get into touch with Indian firms desiring representation in those places.

Bags, Binder Twines, etc.

(J—125)—A firm in Cape Town (South Africa) seeks agency business for the Union of South Africa on behalf of Indian manufacturers of bags, binder twines and allied products.

Cotton Waste.

(J—126)—A firm in Melbourne (Australia) wishes to act as agents for an Indian manufacturer of cotton waste.

Cumin.

(J—127)—A merchant in Casabianca (South America) desires to represent Indian exporters of cumin on a commission basis.

Furs, Hides, Skins. Bones, Hoofs, Horns, Shells, etc.

(J—128)—A firm in Kobe (Japan) wishes to get into touch with Indian exporters of furs, hides, skins, bones, hoofs, horns, shells, dyes and drugs.

Medicinal Herbs, Gold and Silver rings, Indian Condiments, etc.

(J—129)—A Calcutta firm wishes to get into touch with Calcutta exporters of (1) medicinal herbs such as neem, dhatura leaves, etc., (2) gold and silver rings, (3) Indian condiments, Jams and pickles, (4) brass pots, and (5) dry blood and casings.

Nagassar Seed.

(J—130)—A correspondent in Sylhet (Assam) wishes to get into touch with purchasers of Nagassar seed.

Raw Silk and Silk Waste.

(J—131)—A firm in Bombay desires to be put into touch with suppliers of raw silk and silk waste.

Rice Starch.

(J—132)—A Calcutta manufacturer of rice starch wishes to get into touch with purchasers in Calcutta or elsewhere.

Sands.

(J—133)—A correspondent in South India desires to get into touch with buyers of garnetiferous sand and quartzilmenite sand. The former, which is comparatively coarse, could be ground further and used as an abrasive. The latter is rich in ore which could be separated by means of the magnetic process and used in the production of ferro-alloys; it is also suitable for smelting purposes as it stands. The correspondent can supply large quantities of both kinds of sand.

Skins and Leather Goods.

(J—134)—A firm in Barcelona (Spain) desires to get into touch with Indian exporters, preferably of skins and leather goods.

Tea Seeds.

(J—135)—A correspondent in Assam desires to be put in touch with purchasers of tea seeds.

Vegetable Oils, Oilseeds, Hides and Skins, etc.

(J—136)—A firm in Paris (France) desires to be put in touch with firms in India wishing to export Indian produce such as vegetable oils, oil-seeds, hides and skins, gunnies, hessians, and mica, and import Continental products.

Gamchas, Wrappers, Mosquito Curtains, etc

(J—207)—A correspondent in Assam wishes to get into touch with purchasers ef country made cloth, *i,e.*, gamchas, wrappers, mosquito curtains, etc.

Mishmi Teeta.

(J—208)—A Calcutta merchant desires to be put into touch with purchasers of Mishmi Teeta (*Coptis teeta*).

Nuxvomica Root.

(J—209)—A London firm desires to be put in touch with exporters of nuxvomica root.

Polishing Rock.

(J—210)—A firm in Cashmir desires to be put in touch with wholesale purchasers of an abrasive rock said to be efficacious for polishing all kinds of metals without the addition of any chemicals and with very little rubbing. The powdered rock may be applied dry or with the addition only of a little water, oil, turpentine, petrol, grease or wax.

Red Sand.

(J—211)—A correspondent in Assam wishes to get into touch with purchasers of red sand for plastering buildings, etc.

Ambergris and Musk Seeds.

(J—212)—A correspondent in Mymensingh (Bengal) desires to be put into touch with suppliers of ambergris and musk seeds.

Gurkha Kukris.

(J—213)—A firm in Almora (United Provinces) wishes to hear of buyers of Gurkha kukris.

Indian Manufactures.

(J—214)—A correspondent in Cape Town wishes to get into touch with Indian manufacturers requiring representation for the whole of South Africa.

Piecegoods.

(J—215)—A firm in Madura (South India) wishes to get into touch with piecegoods manufacturers in India.

Hemp and Copra.

(J—216)—A firm in Bombay wishes to get into touch with big regular suppliers for export of standard quality of hemp and copra.

Hides, Horns, Tallow, Copra, Manures, etc.

(J—217)—A London firm wishes to secure the agency of a hitherto unrepresented Bombay firm exporting hides, horns, tallow, copra, manures, etc.

Indian Loofas or Lufas.

(J—218)—A firm in the Kangra Valley, Punjab, desires to be put in touch with purchasers and exporters of Indian loofas or lufas.

Ochre.

(J—219)—A firm in South India desires to be put in touch with suppliers of blue ochre.

Pig's Hair.

(J—220)—A firm in Calcutta wishes to hear of purchasers of pig's hair in large quantities.

Sand.

(J—221)—A firm in Bangalore (Madras Presidency) desires to be put in touch with purchasers of white sand.

Coffee, Tea, Jute, Rice, etc.

(J—222)—A firm in France desires representation of Indian exporters of coffee, tea, jute, rice, poppies, cachous, pepper and potato starch.

Gypsum and Mica.

(J—223)—A firm in Rangoon desires to be put in touch with purchasers of gypsum and mica.

Oil Tins.

(J—224)—A firm in South India desires to be put in touch with suppliers of empty oil tins

Agency Business.

(J—225)—A corrospondent in Lahore (Punjab), who will visit Italy, Switzerland, France, England and America early next year, wishes to get into touch with exporting firms in India desirous of establishing business relations in these countries.

Bonemeal.

(J—226)—A firm in Gandevi (Surat) desires to be put into touch with purchasers of bonemeal.

Cements.

(J—227)—A firm in the United Kingdom desires to be put into touch with Indian manufacturers of cements suitable for making imitation stone and marble articles, etc. The cement must be set by permanent chemical action by the action of water only and, must be completely non-absorbent and must not be affected by the various changes in the surrounding atmosphere.

Cocoanut Oil, Linseed, etc.

J—228)—A firm in Alexandria (Egypt) wishes to act on a commission basis for the sale of cocoanut oil, linseed, sesamum seed, beans, bags and sugar.

Corks and Cork Porducts.

(J—229)—A firm in Barcelona (Spain) manufacturing corks and cork products desires to appoint agents in India for the sale of these products, on a commission basis.

Gall-stone.

(J—230)—A firm inJapan desires to be put in touch with exporters of gall-stone, a hard concretion found in the gall-bladder of animals and used as a painting material.

Gunnies.

(J—231)—A firm in Ramegnies-Chin (Belgium) seeks agency for a manufucturer of gunnies.

Hides, Skins, Jute andJute Bags.

J—232)A firm in Trieste (Italy) desires to be put into touch with exporters of hides, skins, jute and jute bags both new and old.

Indian Vetivert Root.

(J—233)—A Calcutta merchant desires to be put into touch with suppliers of Indian vetivert root (Khus-khus) suitable for making perfumes.

Iron Ore.

(J—234)—A local firm desires to be put into touch with any firms that are able to quote for iron ore.

Jute Cuttings.

(J—235)—A firm in Liverpool desires to be put into touch with suppliers of jute cutings.

Jute and Gunny Sacks.

(J—236)—A firm in Vancouver, British Columbia, is desirous of acting as manufacturers' agent for exporters of gunny sacks.

Pigments Red and Yellow Ochre, etc.

(J—237)—A firm in Sydney (Australia) desires to represent Indian firms wishing to purchase Australian products, *e.g.*, pigments, red and yellow ochre, barytes, magnesia, talc, macaroni, eucalyptus oil, olive oil, jam, bacon, butter, soaps.

(Continued from page 39)

"Industrial Commission's Recommendations."

The first question submitted to the Commisson was whether new opening for the profitably employment of Indian capital in commerce and industry could be indicated and the examples from the chemical industries which I have brought before you, in more or less detail, are a sufficient answer. So great is the industrial expasion to which we must look forward in the immediate future, that it is quite impossible for Indian capital to prove all that is necessary. In this connection I would refer to the statement made in the Commission's Report, that they were impressed by the high financial prestige possessed by the better class agency firms, and of their efficient management, cautious finance and watchful attention to the interest of client enterprises; but it is said they exhibit undue reluctance to embark on new ventures. In other words, they have been inclined to develop commerce rather than industries, and have thus been less helpful than might have been the case in clearing the way for continuous industrial progress.

I should have gone further than the Commission and critised the "indent" system which allows agents to indent home for goods, even when they are manufactured a few yards from the consumer. I could give you examples from experience where the consumer in India has paid two, and in some cases three times as much for an indented chemical product as he would have to pay for exactly the same thing manufactured locally. The Commission condemns this system as applied by the Government for the purchase of stores by indent, but they might also have condemned it in the agent, for it undoubtedly tends to check progress.

I fully approve of the recommendations with reference to Government intervention in industries, and assistance to key industries and with the proposals for the collection and dissemination of commercial information. In this connection the recent appointment of an Indian Trade Commissioner in London has already proved itself a sound policy.

It is a question whether British interests in the Persian Gulf and Mesopotomia will not be controlled from India, as Aden has been, but I do not see the reason for the Commission's recommendation of separate organisation in these countries and East Africa for the collection and dissemination of commercial information. (From a paper read at Manchester.)

WORK FOR CHEMISTS.

German Manufactures that Should be Produced by us.

(Sir Reginald Blair M.P.)

One of many foolish proceedings which we in this country regarded before the war with a quite stolid indifference was the export from various parts of our Empire to Germany of raw materials to be made into all manner of chemicals, medicinal and otherwise. Now-a-days most of us will agree that it was in the strict sense suicidal to behave in that altogether shortsighted fashion. For were we not thus materially helping to build up the powerful chemical industry which in a flash was to pour out explosives and the poisons for our own destruction? But to-day we can occupy ourselves better than in vain regrets. We can do what we can, and it is much, to absorb in our own industry the raw materials, which once enriched the Fatherland, not only thereby forestalling the day when Germany will again be able to buy these for herself but in the meantime, by the creation of credits against British exports, making more prosperous our Dominions, Colonies ann Dependencies.

The Riches of India.

Easily first from the point of view of the chemical industry is India. Those adventures of olden times, setting sail thither in quest of "spices, precious stones and drugs for the Poticaries," would have been amazed had they known how rich beyond their rosiest dreams this new land was to be. Every drug in the pharmacopœia might be grown here, and well-nigh half of them do already abound—cinchona coca, belladonna, cassia, tamarind, jalap saffron digitalis, henbane, with many others. Tinnevelly in the South sends us the leaves from which comes senna. Caster oil, that other terror of our childhood, is but one of a full score of oils, amongst which the best known are perhaps those taken from groundnut, cotton the poppy, mowra, linseed, rape, sesame and the chaulmugra seed, the latter yielding the oil that brings fresh hope to lepers. India's export of oil seeds, indeed, runs to the astonishing total of one million tons a year; and seeds apart there is many another valuable oil to be had

from plants. One growing on the Nilgiris gives us methyl-salicylate; the ginger grass of the Nimar uplands, the lemon-grass on the hills of Travancore, hyssop thriving on the side of walls, the cocoanut palms that line the coasts—all these make their contributions, various and valuable, to the world's medicine chest.

German Trade With India.

Nor must one forget that from opium, now forbidden to China, one may now get morphine and codeine. Malabar, again, has its astringent kino; there is black cutch to be had from the Central Provinces; and it is to India that the the tanner goes for his myrobalans the dyer for his indigo. As far as the latter are concerned, it is important to remember to-day that in the last complete year before the war, Germany bought from India more than 300,000 cwts. of all tanning substances. Now it is in their dyestuffs industry that the Germans find those intermediate products which are the raw materials for still other chemicals. For these, then they were largely indebted to India in addition to the many millions of cwts. of castor copra, ground-nuts, mowra, rape, poppy and linseed which they purchased every year. Is there any reason why our own chemical makers should not to that extent strengthen this link that already unites us to our vast dependency? In 1913—14 Germany sent back to India £84,072 worth of chemicals; £69,802 of drugs and medicines. Why cannot England manufacture for her these as well as the bleaching-materials, borax, caustic soda and so on, with which we have for long supplied her?

British Trade Handicapped.

It is the earnest hope of many of us that our country will indeed in the near future make, not for the British Empire only, but for the other nations of the world too, those fine chemicals which once were almost a German monopoly. The war, amongst its myriad lessons, schooled us in the making of them; yet hundreds of the chemists and the skilled workers who had learned these new processes are to-day either at other work or at no work at all. And why? Because Germany, by the mere accident of the exchange, can now flood the markets with drugs and medicines so cheaply produced that an English worker would require to live on 6s. 3d, a week before we could compete with them. In other words, the young British industry which, as Lord Moulton says, is vital to our national existence, is exposed to the East wind of the German mark which, being so low in value, enables the German manufactures to come on to the British Empire markets at prices at which we cannot compete. The German mark has become a menace more terrible than the Zeppelins. It seems reasonable to suggest that this young industry of fine chemical making should be given a chance in this country ere the chance for ever goes; once it was surely established at home, its prospects abroad would be limitless. They have the markets: we have the ability. Sir Robert Horne proposes that German fine chemical manufactures should be admitted only by a system of licences so that the British industry may be protected in the years of its growth. That is the significance of the Key Industries Bill which is to come before Parliament very soon. Never again must we leave the keys of life and death in the hands of our enemies.

Factories Closed Down.

A "People" representative has just visited the fine chemical factories of Messrs. Burroughs, Wellcome and Co., at Dartford, which were erected during the war as the outcome of trade captured from the Germans. To-day they are idle. Wonderful up-to-date plant has no use at all owing to the German dumping. The anti-neuralgic Phenacetin, the anæsthetic Benzamine and the internal antiseptic, Hexamine, were all German products before the war. Since 1914 these products have been produced by Burroughs. Wellcome and Co., but the manufacture of each has now ceased at Dartford owing to the unrestricted importation of German equivalents. The position with regard to alkaloids is the same. During the war cocaine, emetine, atropine, hyoscyamine, hyocine, pilocarpine, etc., were produced on a large scale. A very high standard of purity was set in these products, many of which were prepared from medicinal plants grown on the farm near the works. This deplorable picture of stagnation is by no means confined to the Dartford works. It is typical of the industry in all parts of the country. Works are compelled to close down entirely or to go on short time; valuable plant is lying idle; thousands of workmen, instead of contributing to national reconstruction, are drawing unemployment pay at the expense of the taxpayer.

INDUSTRIAL PEACE.

A New Zealand Model.

(By the Hon Sir John G. Findlay, K.G., LL.D., K.G.M.G.)

Sir John Findlay has unusual qualifications for discussing this subject; he was Lecturer on Political Science at his University, was a member of one branch of the New Zealand Legislature for three years and leader of the other branch for five years; and he has shown both in the books he has publised and in many articles contributed to leading journals, that he is, and has been, a close student of the great industrial problems of the day.

Recent years have witnessed the two great factors in production—Captial and Labour—drifting more and more asunder, mainly from a lack of mutual understanding. This mis-under-standing, so fertile in suspicion, bitterness, and recrimination, can only be removed by both sides getting together, discussing their differences, and laying the foundations of a common council.

We are told that we are drawing nearer to the centre of an industrial and commercial maelstrom, and that we can weather it only by Labour realizing the necessity of reduced wages and Capital of reduced profits. This dual realization can be secured only by some harmonious conference between the two; but that can never be achieved while they confront each other as armed camps. They must meet each other in friendly parley, each animated by a sprit of conciliation and each prepared to recognize that only by the way of a fair mutuality of sacrifice can they emerge from the prevailing darkness and depression into a day ampler than before the war.

Conflict must give place to friendly council, aggressive selfishness to a rational co-operation towards a wider, commoner good. To this end an honest effort must be made to bring the parties together; so that out of discussion—jarring and discordant it may be at first—there may emerge that peace, harmony, and better understanding so essential to the best joint product of the partnership.

There must be a new partnership agreement between the two great factors in production, and its terms must be voluntarily and unreservedly arrived at. This cannot, of course, be done by coercion, by the pressure of economic advantage, by the traditional claims of one partner's superiority, but by man, whether employer or employee, meeting man as man under the obligations of that code which springs from the sense of fair play, and which, if cheerfully obeyed, will assuredly lead to a handclasped co-operation, giving our Empire the supremacy in all branches of economics to which its vigour entitles it among the peoples of the world.object.public welfare.rates.

We in New Zealand are fully alive to the importance of strong, sincere, and energizing cooperation between Capital and Labour; and we have long been struggling with the problem. It would not be true to say that we have found the solution; but this we can say—that we are in the process of evolving an elaborate scheme—an organized effort—which we hope will eventually secure the desired object.

Delegation of Power.

One of the most striking features of recent years in our system of government in New Zealand has been the steady delegation of important powers to export boards and committees for the purpose of solving industrial problems. From one point of view this amounts to an unequivocal admission that our Parliament no longer feels itself competent to deal with those growing complicated problems. No better illustration of this can be given than the Act we recently passed to make better provisions for the maintenance and control of our trades, industries, and commerce. The Act was drawn by Sir John Salmond, admitted in England to be one of the world's greatest jurists, at that time Solicitor-General, and now a Judge of our Supreme Court. This measure, called our Board of Trade Act, places the control and regulation of the industries, trade, and commerce entirely in the hands of our Board of Trade, of which the Minister of Industries and Commerce is the president. The powers given to the Board are practically unlimited, save that no Board of Trade regulation can be made determining the wages or remuneration of the employees in any industry. Wages and remuneration are fixed by a special tribunal under our Industrial Conciliation and Arbitration Acts. I can best illustrate the very wide powers given to the Board by taking Section 26, which runs as follows :—

The Governor in Council may on the recommendation of the Board of Trade make by regulations under the Act such powers as he deems necessary in the public interest for the following purposes :—

(*a*) For the prevention or suppression of methods of competition, trading, or business, which are considered to be unfair or prejudicial to the industries of New Zealand.

(*b*) For the prevention or suppression of monopolies or combinations in or in relation to any industry which are considered to be prejudicial to that or any other industry in New Zealand or to the public welfare.

(*c*) For the establishment of fixed or minimum or maximum prices or rates for any classes of goods or services or otherwise for the regulation or control of such prices or

(*d*) For the prohibition, regulation or control of differential prices or rates for goods or services or the differential treatment of different persons or classes of persons in respect of goods or services in cases where the existence of such differential prices, rates, or treatment is considered prejudicial to any industry in New Zealand or to the public welfare.

(*e*) For the regulation and control of industries in any other manner whatsoever which is deemed necessary for the maintenance and prosperity of those industries and the economic welfare of New Zealand.

All these regulations are to take effect when *Gazetted* or at any later date specified in the regulations.

From the standpoint of common welfare the community must be regarded not as a mere collection of individuals, each pursuing his own interest, but as an organization of inter-dependent sections or groups each serving the other—the basis of national well-being is the social service of each group, and the true cure for industrial discord and unrest is an enlightened reciprocity among these services achieves the best result for itself, not by selfish exactions, but by a wise subordination of these exactions to the best results to be obtained by a cordial co-operation with all other services. (*Times.*)

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